Vermont Farm Methane Project Quarterly Report

Prepared by: Jeffrey W. Forward, Project Coordinator **July 10, 2001**

Introduction:

The Vermont Department of Public Service (DPS) and the Vermont Department of Agriculture (AGR) received a $300,000 appropriation from the FY 2000 federal budget to promote the use of methane recovery technology on Vermont dairy farms. This technology has the potential to help farmers with their nutrient management plans and at the same time provide additional on-farm income. The goal of this project is to identify and help overcome key strategic hurdles to widespread adoption of methane recovery technologies by Vermont farmers.

The project was designed to consider methane recovery in a broad context, taking into account its potential benefits as a component of a comprehensive nutrient management system, as a renewable energy source and as a strategy for greenhouse gas reduction.

PROJECT ACTIVITIES April 1, 2001 - June 30, 2001

Organizational: The project has secured Phase II funding through another budget appropriation and is developing a 3 year project implementation plan for this money. The plan calls for using one third of the money for project administration and outreach, one third toward research and development and one third to be used for cost share for installations. Dan is working on a next steps document and hopes to have a first cut done by the end of the April. This is needed to move forward on the next phase of the project.

With this next phase in mind, a significant task over this past quarter has been working with the Biomass Energy Resource Center (BERC) to find a permanent home for this project. Although in development for nearly a year, BERC only recently incorporated as a not-for-profit private corporation with the mission of promoting and developing biomass energy projects. This is a project oriented organization hopes to work on biomass projects in Vermont, the Northeast and globally. Vermont has considerable experience in small and medium scale biomass projects and the goal of this organization is to export that expertise by facilitating specific projects. The Vermont Methane Project is in the process of setting up a part time staffing position at the Biomass Energy Resource Center that will be specifically devoted to this project.

Foster Bros. Dairy Farm research and demonstration site: Foster Bros. have a two chambered side-by-side digester that they have been using successfully for over 15 years. The Vermont Methane Project has isolated these into two separate digesters so that we can experiment with various materials and technologies and still maintain a control that we know works.

Fosters began loading the digester in December. Although they encountered some delays getting the system on line it is now fully operational and has been producing biogas generated electricity since January. Next steps include designing and implementing a data collection protocol and performing specific experiments using this side-by-side digester. We should be ready to try a thermophilic trial soon. This is an area that many are excited about. If we manage to maintain a practical cost effective

thermophilic reaction we have the potential of cutting the digester reactor vessel cost in half.

Feasibility Studies: Jeff Forward and Dan Scruton have contacted 17 farms that have expressed interest in this project. The project managers visited 13 of those and have completed several pre-feasibility studies. The remaining reports are being finalized and will be sent to farmers shortly. A sample copy of one report was attached to a previous quarterly report.

Site Specific Engineering Studies: We have begun designing a system for a 800 cow farm in Addison County and want to investigate a series of options for this site.

Attached Growth Media Experiments: The project hired Steven Hoyt from Dubara Company to perform experiments on attached growth media in an attempt to speed the production of biogas and thereby reduce the retention time of manure in an anaerobic digester. The premise of this research is that reduced retention time of manure in a digester will allow engineers to design smaller digester and thereby reduce capital costs. Mr. Hoyt completed his research and his final report is on file.

Methane Resource Assessment: The project hired Jeff Fehrs to research the volume of available organic wastes in Vermont that could be digested to produce methane. The goal of this research is to determine the energy potential of these various waste streams. These organic wastes include manure, biosolids and septage, industrial food waste and whey. Mr. Fehrs research is complete and his report has been reviewed by the advisory committee and published by the DPS.

Net Metering: Net metering is a concept whereby a customer may generate electricity and send it on to "the grid" or alternatively use electricity by buying it from the grid. The monthly bill is then calculated using the "net" of these two amounts. The Public Service Board (PSB) had been instructed to draft rules for this concept by the legislature. The DPS along with a number of parties to the docket have been providing technical recommendations. The PSB issued a board order approving requirements for interconnection for farm methane net metering facilities.

Outreach:

Out-of-state Outreach

NRAES Conference in Rochester, NY: In March, Dan Scruton traveled to the Natural Resource, Agricultural, and Engineering Service (NRAES) Manure Conference in Rochester, NY. Bob Foster and Stan Weeks were both on the program. Bob did a great job talking about his experiences with anaerobic digesters and Stan discussed new innovations in digester technology using the system he is designing with NYSERDA as an example but, the steam injection and thermophilic ideas we are working on were also mentioned. The region now knows about the work we are doing in Vermont.

Most valuable, were the discussions Dan had with the folks at NYSERDA and Cornell. They have agreed to look at our proposals and collaborate on research so that both groups can minimized duplication of efforts and can build on each others work. As a specific example we are looking at a thermophilic liquid system at one farm and NYSERDA is going to try an attached growth liquid system. Both will reduce retention times and having both types will make for good collaborative data to determine the

advantages and disadvantages of each. Also, Cornell is working on some of the pathogen issues we were considering and so we will not have to do that and can concentrate on simplifying the digesters to reduce cost and to improve adoptability.

In-state Outreach

In March, Jeff attended a meeting of the Vermont Public Power Supply Authority (VPPSA), Burlington Electric Department (BED), Vermont Electric Cooperative (VEC), Washington Electric Cooperative (WEC) and the DPS. This meeting was called by VPPSA to discuss their upcoming power supply needs. Apparently all of these utilities have numerous power supply contracts that expire within the next two to three years. They were interested in finding out if renewable energy could meet some of there power supply needs and if so how much. Representaives from Renewable Energy Vermont were at this meeting to give these folks a sense of scale for renewable power supply options. Of the three sources represented at this meeting, wind, solar and biomass, farm based methane was the largest potential source and the one that could be implemented the quickest. Several if not all of the utilities were interested in exploring how they might work with the project to help farmers who are considering the technology. Possibilities discussed included innovative rate design, competitive wholesale power rates, engineering assistance and green pricing. Jeff scheduled a site visit with VEC engineers to Fosters and will continue to follow-up on this interest. One of the barriers this projects has identified elsewhere has been the challenges of working with reluctant utilities. If the project can work with receptive utilities, then many more possibilities become feasible.

Dan has been on the road and has a new prospective farm that may want to consider a digester. He is early in the discussions but thinks the farm may be a good candidate. Jeff has received several more leads as well. As part of the next phase of the project, we will begin to prioritize these leads and create a plan for delivering outreach services for new prospects.

For more information on the Vermont Farm Methane Project contact:

Jeff Forward
Richmond Energy Associates
PO Box 615
Richmond, VT 05477
(802) 434-3770
FAX: (802) 434-2344
forward@together.net

Dan Scruton
Vermont Department of Agriculture
116 State Street
Drawer 20
Montpelier, VT 05620-2901
828-3836
dan@agr.state.vt.us

Attachments:

- Description of the Natural Resource Agricultural and Engineering Service
- Description of NRAES Dairy Manure Conference held in Rochester, NY March 20 - 22.